

Wide Temperature Range DC-DC Boost Converters for Command/Control/Drive Electronics, Phase I

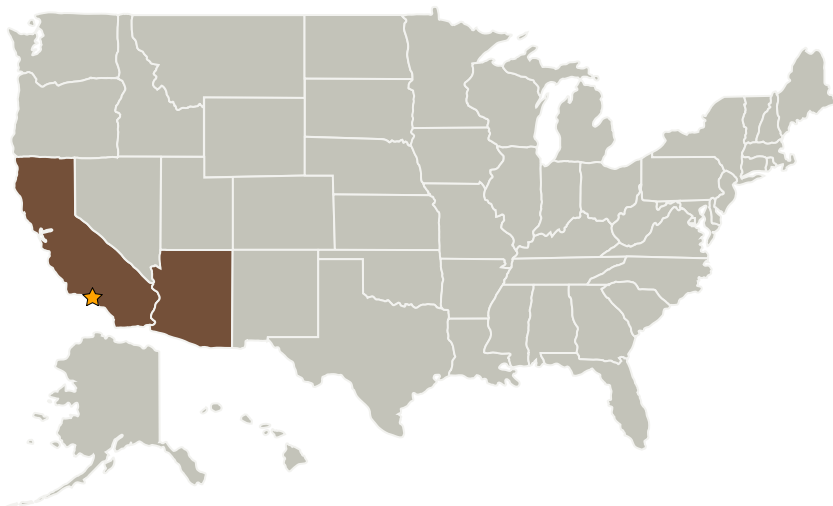
Completed Technology Project (2008 - 2008)



Project Introduction

We shall develop wide temperature range DC-DC boost converters that can be fabricated using commercial CMOS foundries. The boost converters will increase the low voltage supply (~ 0.7 to 3V) of an advanced CMOS integrated circuit to the higher values (3-10V) required for integrated command/control/drive electronics for sensors, actuators and instrumentation. The high voltage capability is a result of our patented, CMOS compatible transistor technology that is radiation tolerant ($TID > 1$ MRad), SEL immune and capable of wide temperature range operation (-196°C to $+150^{\circ}\text{C}$). This new transistor technology has been demonstrated at multiple foundries and advanced device models are available for circuit design and simulation. The DC-DC boost converters will be integrated directly with the CMOS components to provide a single chip solution, greatly reducing the number of active and passive components that would otherwise be required. By allowing enhanced voltage operation in future CMOS technology nodes we will be avoiding many of the obsolescence problems facing NASA missions that are dependent upon commercial electronics. The circuits will be designed to operate in low temperature environments that experience wide temperature swings such as those found on the moon, Mars, Titan, Europa and comets.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
SJT Micropower	Supporting Organization	Industry	Fountain Hills, Arizona

Primary U.S. Work Locations

Arizona	California
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Joseph Ervin

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.3 Mechanical Systems
 - └ TX12.3.1 Deployables, Docking, and Interfaces